

The Importance of Place of Residence: Examining Health in Rural and Nonrural Areas

We examined differences in health measures among rural, suburban, and urban residents and factors that contribute to these differences.

Whereas differences between rural and urban residents were observed for some health measures, a consistent rural-to-urban gradient was not always found. Often, the most rural and the most urban areas were found to be disadvantaged compared with suburban areas.

If health disparities are to be successfully addressed, the relationship between place of residence and health must be understood. (*Am J Public Health*. 2004;94:1682–1686)

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DURING THE PAST FEW

decades, Americans have continued to experience improvements in health, such as decreased use of tobacco and increased life expectancy.¹ The health of persons who live in rural areas also has improved, yet rural populations fare worse on many dimensions of health compared with populations at other levels of urbanization, particularly suburban populations.^{2,3} Documenting the extent and the nature of these disparities is necessary for the development of policies and programs designed to eliminate rural disadvantage.

The *2001 Urban and Rural Health Chartbook*³ includes health data through 1998 and uses a 5-level rural–urban classification: central counties of large (population ≥ 1 million) metropolitan areas (counties that include all or part of the largest or central city of the metropolitan area), fringe (or suburban) counties within large metropolitan areas, small metropolitan counties (within a metropolitan area with a population of <1 million), nonmetropolitan counties that include a city with 10 000 or more residents, and nonmetropolitan counties that do not include a city with 10 000 or more residents. These categories were developed in accordance with the 1990 Office of Management and Budget (OMB) standards for defining metropolitan areas and a modification of the urban influence codes (revised December 1996) developed by the Economic Research Service, US Department of Agriculture

(USDA).⁴ This classification orders counties by degree of urbanization so that central counties of large metropolitan areas are referred to as *the most urban* and nonmetropolitan counties that do not include a city with 10 000 or more residents are referred to as *the most rural*.

EVIDENCE OF RURAL HEALTH DISADVANTAGE

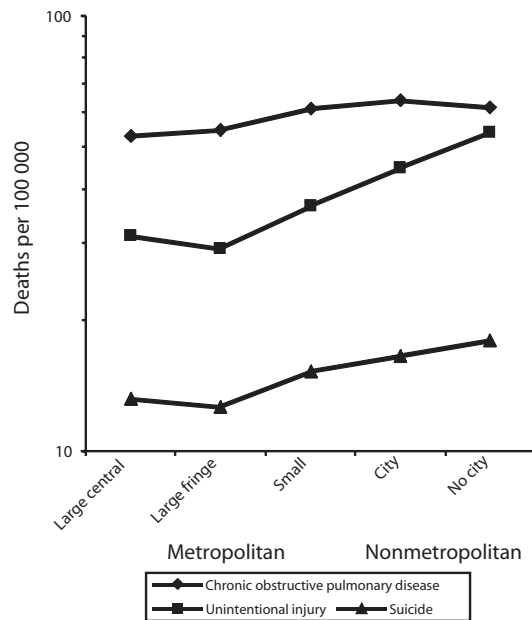
The health of a population can be measured along many dimensions by indicators that reflect mortality, morbidity, overall well-being, lifestyle behaviors, and other health-related risk factors. While rural–urban differences do not exist for some health measures, and some adverse health measures are highest in urban areas (e.g., homicide),³ we examined health measures that showed a health disadvantage in rural areas. Moreover, research indicates that rural–urban health patterns are not always monotonic; often, the most rural and the most urban areas have higher rates of adverse health when compared with suburban areas.

Mortality

Premature mortality (before 75 years of age) is greater among rural residents than among urban residents,⁵ and rural–urban mortality differences vary by age.³ In 1997 and 1998, infant mortality rates were lowest in suburban counties, and rates for more urban and more rural counties exceeded that for suburban counties by

23% and 26%, respectively.³ The age-adjusted death rate among persons aged 1 to 24 years who lived in the most rural counties was 31% higher than among children and young adults who lived in the most urban counties (i.e., central counties of large metropolitan areas) and 65% higher than among those who lived in suburban counties.³ The age-adjusted death rate among adults aged 25 to 64 years who lived in the most rural counties was 32% higher than among residents who lived in suburban counties, and the rate was similar to that among working-age adults who lived in the most urban counties. The death rate among adults aged 65 years and older who lived in nonmetropolitan counties was 7% higher than the rate among residents who lived in the most urban counties. Although the relative discrepancy between residents who lived in rural and urban counties was less pronounced among the older age group, the difference reflects a greater number of deaths because of the higher death rates among older persons.

Compared with more highly urbanized counties, rural counties in the United States had higher death rates from unintentional injuries, suicide, and chronic obstructive pulmonary disease.³ The age-adjusted death rate for unintentional injuries among residents who lived in the most rural counties was 86% higher than the corresponding rate among suburban residents (Figure 1). These deaths, which include deaths caused by



Source: Eberhardt et al.³

Note. Rates were age-adjusted. The 5 urbanization levels are: central counties in large metropolitan areas (population ≥ 1 million), fringe (suburban) counties within large metropolitan areas (population ≥ 1 million), small metropolitan areas (population < 1 million), nonmetropolitan counties with a city (population $\geq 10,000$), and nonmetropolitan without a city (population $> 10,000$).

FIGURE 1—Cause-specific death rates, by urbanization level: United States, 1996-1998.

motor vehicle crashes, significantly contribute to the higher death rate from all causes among young persons who lived in rural counties. The age-adjusted suicide rate among persons aged 15 years and older who lived in nonmetropolitan counties was 37% higher than the rate among suburban residents. Most of this discrepancy was attributed to the greater difference in suicide rates among men. The suicide rate among men who lived in the most rural counties was 47% higher than the rate among men who lived in suburban counties. The chronic obstructive pulmonary disease death rate also was higher in rural areas. Men who lived in nonmetropolitan counties had a chronic obstructive pulmonary disease death rate that was 32% higher than

among men who lived in the most urban counties.

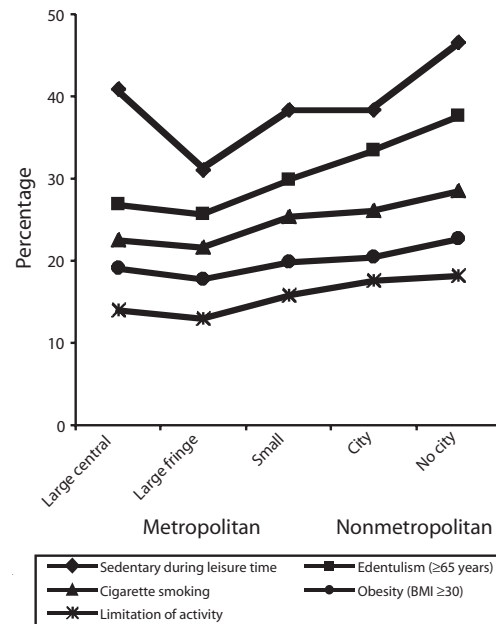
Death rates for cardiovascular disease and cancer have been shown to be higher in rural areas within certain regions of the country. In rural areas, the heart disease mortality rate was highest in the South and was 25% higher than the rate among Southern suburban residents.³ One study in Appalachia found coronary heart disease death rates to be persistently higher in rural areas, despite the decline in heart disease mortality over the past few decades.⁶ Chronic heart disease death rates among African American females showed a 10-fold difference among counties where estimates were available. The highest rates tended to be among residents who lived in rural counties, espe-

cially among those who lived in the Mississippi River Delta.⁷ Stroke mortality also is higher among rural African Americans.⁸ Between 1994 and 1998, a study in Appalachia found that the overall cancer mortality rate among these rural residents was higher than the rate among the total US population.⁹

Morbidity and Chronic Health Conditions

While evidence of higher rates for morbidity or chronic health conditions in rural areas is limited, some differences have been observed. Among persons aged 65 years and older, the prevalence of edentulism (i.e., total tooth loss) in 1997 and 1998 increased from

27% among residents who lived in large metropolitan counties to 38% among residents who lived in the most rural counties (Figure 2). Limited availability of dental care has been associated with reduced oral health in rural areas.¹⁰ The self-reported prevalence of arthritis was higher among nonmetropolitan residents than among metropolitan residents,¹¹ and the prevalence of diagnosed diabetes was higher among residents who lived in the most rural counties than among residents who lived in suburban counties.¹² The prevalence of hypertension varied by urbanization, gender, and geographic region in the United States¹³; for example, in the South, blood pressure mea-



Source: Eberhardt et al.³

Note. Rates were age-adjusted. The 5 urbanization levels are: central counties in large metropolitan areas (population ≥ 1 million), fringe (suburban) counties within large metropolitan areas (population ≥ 1 million), small metropolitan areas (population < 1 million), nonmetropolitan counties with a city (population $\geq 10,000$), and nonmetropolitan without a city (population $> 10,000$).

FIGURE 2—Prevalence of risk factors and chronic health conditions among adults, by urbanization level: United States, 1997-1998.

sures among non-Hispanic White men were higher among residents of nonmetropolitan counties than among residents of metropolitan counties.

Broader measures of health and well-being have shown that rural populations have poorer health status. In 1997 and 1998, 18% of rural adults (aged 18 years and older) reported chronic health conditions that caused activity limitation compared with 13% of adults who lived in suburban counties (Figure 2). Similarly, 1998 data from the National Health Interview Survey showed that 16% of adults who lived in the most rural counties reported being in fair or poor health compared with 9% of adults who lived in suburban counties (data not shown). Medical visits for pain-associated conditions (including degenerative joint disease and low-back pain) were higher among nonmetropolitan residents than among metropolitan residents.¹⁴

Despite the higher suicide rate among rural county residents (Figure 1), other indicators of mental health have not shown consistent rural–urban patterns. In 1991, the prevalence of any psychiatric disorder was similar among both rural and urban residents¹⁵; however, a measure of negative mood was more prevalent among rural males than among suburban males,¹⁶ and arrests for driving under the influence of alcohol were higher among rural residents than among suburban residents.¹⁷ Factors that may account for the inconsistent rural–urban pattern in diagnosed mental health measures include (1) greater stigma toward mental illness in rural areas,¹⁸ (2) less frequent diagnosis of mental illness in rural areas,¹⁹ and (3) treatment differences between rural and nonrural areas.²⁰

Risk Factors

It is important to identify rural–urban patterns in modifiable risk factors that may contribute to the rural–urban disparities in health. Cigarette smoking is one such example. In 1997 and 1998, the prevalence of cigarette smoking among US adolescents and adults who lived in the most rural counties was 19% and 32% higher, respectively, than among their suburban counterparts.³ The higher prevalence of smoking among those who lived in rural areas likely contributes to the rural–urban disparity in chronic obstructive pulmonary disease mortality, while the higher prevalence of smoking among rural adolescents portends future smoking-related health disparities.

The prevalence of self-reported obesity in 1997 and 1998 was 28% higher among adults who lived in the most rural counties than among adults who lived in suburban counties (Figure 2). Similarly, leisure-time physical inactivity (a component of a sedentary lifestyle) was 50% higher among adults who lived in the most rural counties than among their suburban counterparts (Figure 2). These patterns in obesity and leisure-time inactivity likely contributed to the higher prevalence of diabetes among residents who lived in rural counties.^{12,21}

Demographic and socioeconomic factors, such as race, ethnicity, education, and income, also are strongly related to health and vary between rural and urban settings,^{3,22} and these factors contribute to health differences among rural and nonrural residents. In the West and the South, infant mortality rates in nonmetropolitan counties are higher than rates among infants born in metropolitan (particularly suburban) counties.³ Infants born to mothers

who are American Indian/Alaska Native or African American have higher mortality rates than infants born to mothers of other race groups.¹ In 1998, the combined population of these 2 race categories comprised 7% to 20% of the nonmetropolitan populations in the West and the South, respectively, compared with less than 3% of the nonmetropolitan populations in the Midwest and the Northeast. Thus, regional demographic differences account for a portion of the higher infant mortality rates in rural areas of the West and the South.

Health insurance coverage also is related to rural health patterns. In 1997 and 1998, the proportion of the population that did not have health insurance was higher among residents of the most rural and the most urban counties than among residents in other areas.³ Nearly 21% of residents aged younger than 65 years who lived in the most rural counties reported being uninsured compared with 12% of suburban residents.

Health insurance status is related to income,²² and the lower income levels in the most rural counties compared with suburban counties³ contribute to the difference in the proportion that is uninsured. The difference between suburban counties and the most rural counties in the proportion that did not have health insurance was reduced, but not eliminated, when insurance coverage was examined for those whose family incomes were below 200% of the federal poverty threshold (30% uninsured in suburban counties vs 34% in the most rural counties). Poor and near-poor rural residents also were less likely to report having Medicaid coverage than residents of the most urban counties (21% vs 30%). Among persons aged

younger than 65 years whose family incomes were 200% of the federal poverty threshold or higher, 11% of residents in the most rural counties lacked health insurance versus 7% of suburban county residents. Thus, lower incomes were partially responsible for the higher proportion of uninsured persons in rural counties.

Differences in occupation and employment also are likely to have contributed to the higher proportion of rural residents who lacked health insurance. Fewer rural residents obtained private insurance through their workplaces than suburban residents.³ In 1997 and 1998, 62% of nonmetropolitan residents aged younger than 65 years reported that they obtained private health insurance through their workplace compared with 75% of suburban residents.

DISCUSSION

In 2000, nearly 50 million US residents lived in nonmetropolitan counties.²³ Evidence exists that, compared with residents at other levels of urbanization, these rural residents fare worse on many indicators of population health. Higher death rates from unintentional injuries, chronic obstructive pulmonary disease, and suicide contribute to higher overall death rates among rural residents compared with suburban residents. Modifiable risk factors, such as obesity and smoking, are more common among rural residents and are related to higher mortality rates and prevalence of chronic health conditions in rural areas.

Rural residence does not always confer a health disparity; urban areas fare worse than other areas on some health indicators (e.g., homicide). The most urban and the most rural areas share

common concerns, such as higher infant mortality rates and lack of health insurance. Differences in health status may reflect socioeconomic and demographic differences across levels of urbanization, and these differences vary by region.³ Other factors, such as geographic differences in dietary preferences among rural areas, also may be involved. An improved understanding of these cultural factors will assist in efforts to reduce health disparities.

The National Rural Health Association has called for continued rural health research,²⁴ which will help document progress toward reducing rural health disparities. Continued monitoring also will identify areas of persistent rural disadvantage and emerging rural health concerns. Monitoring national health objectives through the *Healthy People 2010* initiative includes assessments of some measures by urbanization levels,²⁵ and the new *Rural Healthy People 2010* initiative²⁶ will expand this effort.

The ability to assess trends in the health of rural populations compared with more urban populations is affected by changes in how rural and nonrural residence is determined. The most recent OMB metropolitan-area classification system extensively revised the rules for determining metropolitan and nonmetropolitan status.²⁷ According to the 1993 OMB definition of metropolitan areas, there was a 10% increase between 1990 and 2000 in nonmetropolitan population size, from 50 to 55 million.²³ However, new metropolitan designations²⁷ and county population changes during that decade have reclassified previously nonmetropolitan counties as metropolitan, and these reclassifications reduced the nonmetropolitan population in 2000 to 49 mil-

lion.²⁸ The nonmetropolitan population would have been even smaller after the new classification had there not been a net gain in population as a result of migration into nonmetropolitan areas between 1995 and 2000.²⁹

Perhaps more important for the assessment of health disparities across levels of urbanization is the ability to identify the fringe/suburban counties of large metropolitan areas. According to data from the late 1990s, this category often included the healthiest populations.³ This category is important when determining the full extent of health differences across populations on the basis of area of residence. The recent OMB and urban influence code classifications did not permit this level of disaggregation.

Efforts to reevaluate rural-urban patterns in health in accordance with the new OMB metropolitan criteria and the updated USDA classifications for rural and urban areas are just beginning.²⁸ Preliminary analyses of national data show that patterns in variation in health indicators previously reported³ tend to persist when the most recent health data (for years 2000–2002) are categorized by the 1993 OMB metropolitan-area definitions and urban influence codes. Additionally, the patterns that were observed when the new categories of urbanization (2003 OMB classification system and revised urban influence codes) were used also led to conclusions generally similar to those when the older rules and categories were used, but the full range of variation was obscured by not distinguishing suburban counties. A more complete exploration of the impact of these new definitions is needed to fully understand trends in rural-urban health disparities.

CONCLUSIONS

On some key measures of health, residents of rural areas fare worse than residents of more urbanized areas. Many factors are related to rural health disparities, including demographic and socioeconomic characteristics, health risk factors, and health care access. Differences in health status often do not exhibit a monotonic pattern between rural and urban areas, and the greatest differences usually occur between rural and suburban areas. Therefore, accurately characterizing health disparities across the rural-urban continuum will require measures of urbanization that include a suburban category. Continued rural health research will document progress toward eliminating the health disadvantage of rural areas and will provide information to policymakers who seek more efficient targeting of limited public health resources. ■

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Contributors

M.S. Eberhardt obtained and reviewed the commentary findings and led the writing. E.R. Pamuk assisted with outline development and writing. Both authors originated ideas, interpreted findings, and reviewed drafts of the article.

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